AMBIENT AIR QUALITY SURVEY:

CANADIAN GYPSUM COMPANY

WESTON, ONTARIO

OCTOBER 1990

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CANADIAN GYPSUM COMPANY, WESTON, ONTARIO

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Executive Summary

A mobile air monitoring unit from the Air Resources Branch conducted an air quality survey in the vicinity of the Canadian Gypsum Company (CGC) plant in northwest Toronto during the period July 24 to August 4, 1989. Survey objectives were to measure the ambient concentration of total reduced sulphur compounds (rotten egg odour) and various organic and chlorinated organic compounds.

The monitoring crew noticed only one brief odour episode for total reduced sulphur, when a 1-minute average of 37 ppb was reached but the maximum 1/2-hr average concentration was low (7 ppb).

Organic compounds were not found in significant concentrations during any of the monitoring periods. Phenolic resin odours were noticed only during a pre-screening sample period but could not be measured by the analytical system in use.

1.0 Introduction

As requested by the Central Region a mobile air monitoring unit (MAMU #1) from the Air Resources Branch conducted an ambient air quality survey in the vicinity of the Canadian Gypsum Company (CGC) plant in northwest Toronto during the period July 24 to August 4, 1989. The survey objectives were to determine the ambient concentration of total reduced sulphur (TRS) compounds (mainly hydrogen sulphide - H_2S - which causes rotten egg odour), and to analyze ambient air samples on the gas chromatograph (gc) for the presence of organic and chlorinated organic compounds.

2.0 Source Description

The CGC plant is a manufacturer of rock wool insulation, as both loose rock wool and bat insulation. The bat insulation has phenolic resins added to bind the rock wool together. The company has installed control equipment to reduce odours and contain particulate, but continues to be the object of complaints about odour and rock wool emissions into the adjacent residential area.

The CGC plant is located on Oak Street, near Weston Road about one kilometre south of highway 401. There is a great deal of heavy truck traffic in the area due to the proximity of the major highways, a Knob Hill Farms terminal on the north side of Oak Street, and many other industries in the area.

3.0 Results

The weather during the survey period featured hot days with low wind speeds, interspersed with several days of thunderstorm activity. There were very few suitable monitoring periods (with steady wind speeds more than one metre per second and steady wind direction) when the CGC plant emissions, and only that plant's emissions, could be sampled with some degree of confidence.

Only six days of the two week period were suitable for monitoring. Twelve separate periods produced 11 downwind 1/2-hr samples for the gas chromatograph and 2 upwind 1/2-hr samples for comparison. The monitoring locations and periods are shown on Figure 1 and listed in Table 1.

3.1 Organic compounds

The gas chromatographic analyses were dominated by the usual

list of compounds present in areas of heavy vehicular traffic: butane, pentane, benzene, toluene and xylenes (m-, p-, and o-).

A few chlorinated organic compounds were found, but at concentrations found in most downtown Toronto samples (a few micrograms per cubic metre of ambient air). None of the target compounds listed in Table 2 were found in concentrations exceeding or approaching any of their established provincial standards (where they exist). Also, both upwind samples (one acquired east of the CGC plant in a residential area, the other acquired west of the plant near Weston Road) showed concentrations generally higher than any of the downwind samples. This supports the view that the CGC plant was not a significant source of the target compounds listed in Table 2.

Some pre-screening air samples were collected by portable samplers during a period of mild resin-like odours two weeks before the survey started. Analysis did not detect any compounds that could have caused the odour.

Several samples were also collected by portable sampler during the survey period and analyzed at the Air Resources Branch. Those results are shown in Table 3.

3.2 Total reduced sulphur (mainly hydrogen sulphide-H_2S)

The sulphur analyzer used in this survey detects all reduced sulphur compounds (including H_2S) equally well, but can not distinguish between them. The most probable reduced sulphur compound in this case is H_2S, but without confirmatory identification by another technique the results must be reported as total reduced sulphur (TRS).

The concentration of TRS was always low (< 5ppb) except for a brief period on July 25 around 11:15 a.m., when the distinct odour of rotten eggs was present along Holley Street adjacent to the southwest side of the CGC plant. The maximum concentration of TRS was 37 ppb (parts per billion) for a 1-minute average, which is large enough to cause the odour level observed by the monitoring crew of MAMU #1, but the maximum 1/2-hr average was only 7 ppb. There is no Ministry standard or criterion in Ontario for ambient air TRS except for kraft pulp mills (27 ppb - 1/2-hr average). The general Ministry standard for H_2S is 20 ppb for a 1/2-hr average.

4.0 Conclusions

Organic and chlorinated organic target compounds were not found in significant concentrations during any of the monitoring periods.

The monitoring crew noticed only one brief odour episode for total reduced sulphur, when a 1-minute average of 37 ppb was reached but the maximum 1/2-hr average concentration was low (7 ppb).

Phenolic resin odours were noticed only during the pre-screening sample period at fairly mild intensity levels. The pre-screen sample analysis showed nothing significant, however, either because of very low levels or because phenolic compounds are polar in character (hence odorous) and not usually detected by the analytical system used in the MAMU #1 or the lab at ARB (using a preconcentrator-gas chromatograph system).

Fig. 1

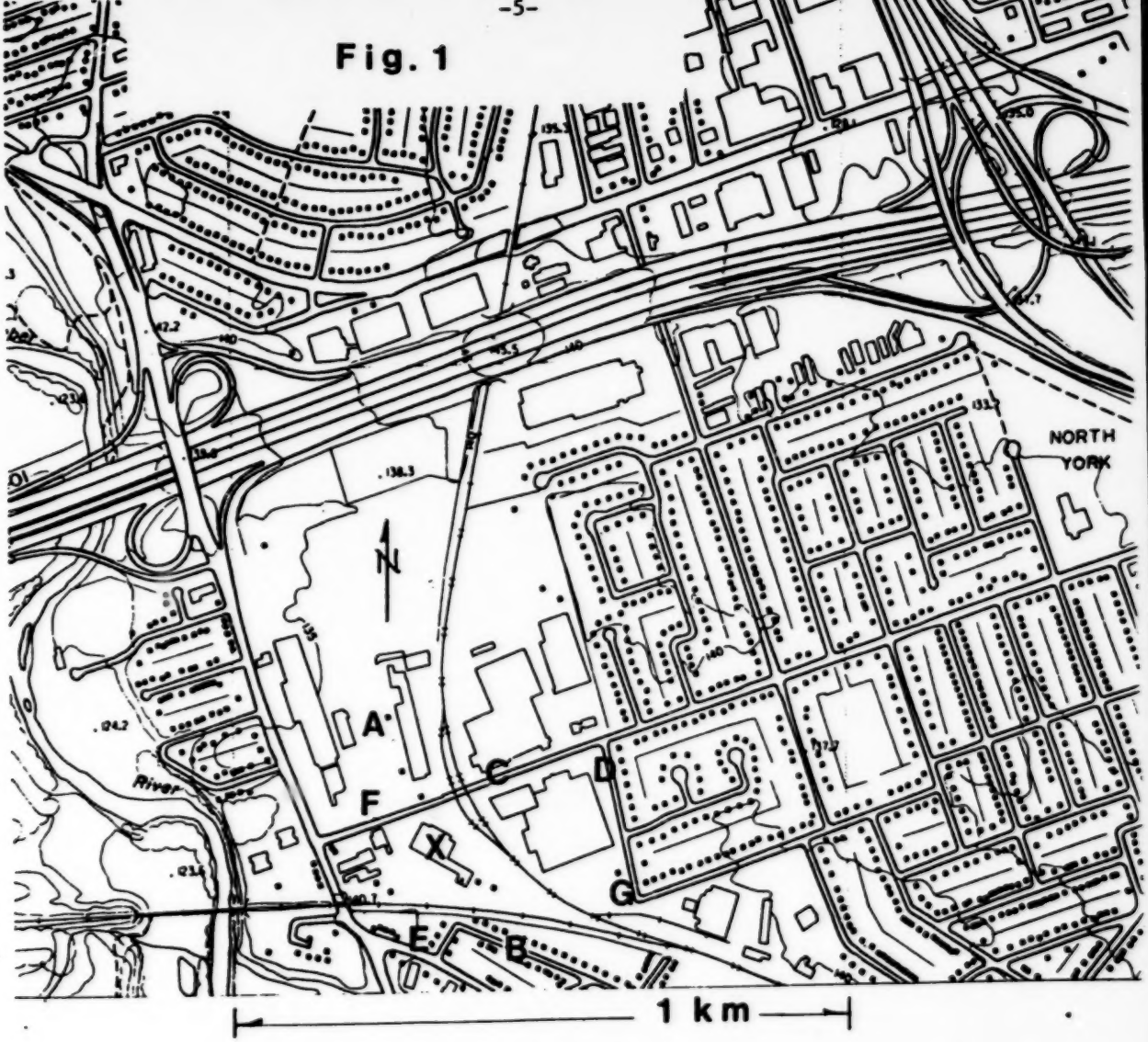

TABLE # 1
Monitoring Locations and Periods

Date	Period #	Start Time	Duration (hrs)	Location	Map I.D. (Fig. 1)
July 24/89	A242	13:50	0.70	East side of Knob Hill Farms	A
July 24/89	A243	14:42	1.23	East side of Knob Hill Farms	A
July 25/89	A252	10:58	1.07	Holley Ave (near #44)	B
July 27/89	A272	11:46	1.12	Oak St.(30 m east of train line	C
July 27/89	A273	13:13	2.08	Yelland St near Oak St	D
July 28/89	A282	11:19	0.72	Holley Ave (near #47)	B
July 28/89	A283	12:28	2.65	Plaza at Parke St/Weston Rd	E
July 31/89	A312	11:12	2.05	Knob Hill Farms parking lot	F
July 31/89	A313	13:36	1.22	Yelland St and Queenslea Ave	G
Aug. 3/89	A033	10:55	4.05	Yelland St and Queenslea Ave	G
Aug. 4/89	A042	10:40	1.00	Parke St and Weston Rd	E
				CGC	X

Table 2 Canadian Gypsum Company (1989)
(ug/m^3)

	Period #	A24JUL_2	A24JUL_3	A27JUL_1	A27JUL_2	for 30-min sample (see notes)	
	Monitoring period	1351-1421	1449-1519	1147-1217	1310-1340		
	Date	JUL 24	JUL 24	JUL 27	JUL 27		
	Downwind / Upwind	DOWNWIND	DOWNWIND	DOWNWIND	DOWNWIND	MDL	MQL
1	PROPANE	26	17	11	10	0.4	2.2
2	CHLOROETHENE					1.2	5.9
3	BUTANE	362	139	53	33	2.4	12.2
4	PENTANE	118	47	34	25	1.8	9.1
5	DICHLOROMETHANE	i				7.9	39.6
6	HEXANE	35	16	18	10	1.1	5.6
7	TRICHLOROMETHANE					27.7	138.4
8	1,2-DICHLOROETHANE					3.5	17.6
9	1,1,1-TRICHLOROETHANE	T	T	20	26	2.7	13.4
10	BENZENE	i	17	i	18	1.5	7.6
11	TETRACHLOROMETHANE	i		i		5.0	25.0
12	TRICHLOROETHENE					4.7	23.4
13	HEPTANE	T	T	T	T	1.3	6.3
14	TOLUENE	47	33	85	205	3.9	19.3
15	TETRACHLOROETHENE					6.5	32.5
16	OCTANE	T	T	T	T	0.8	3.8
17	CHLOROBENZENE					2.1	10.7
18	ETHYLBENZENE	T	T	T	T	2.3	11.3
19	M,P-XYLENE	T	T	31	25	4.1	20.7
20	STYRENE			T	T	2.0	9.9
21	o-XYLENE	T	T	11		1.8	9.0
22	1,1,2,2-TETRACHLOROETHANE			T		11.5	57.3
23	NONANE		T	T	T	1.5	7.4
24	1,2,4-TRIMETHYLBENZENE			i	i	4.6	23.0
25	1,3-DICHLOROBENZENE					6.1	30.5
26	DECANE					1.9	9.3
27	1,2-DICHLOROBENZENE					6.4	31.9
28	1,2-DIETHYLBENZENE					4.4	21.8
29	UNDECANE		T	T		3.7	18.4
30	1,2,4-TRICHLOROBENZENE					10.3	51.3
31	NAPHTHALENE					10.4	52.1
32	DODECANE		T			4.3	21.5
33	TRIDECANE			T	T	2.1	10.6
	Total Organics (ug/m3)	708	334	390	422		

MDL - minimum detectable level, as determined from seven replicate injections
MQL - minimum quantifiable level (5 x MDL), below which exact numbers are not quoted
T - result between MDL and MQL
i - interference present, compound may or may not be present - so exact result is not quoted

Table 2 Canadian Gypsum Company (1989)
(ug/m^3)

	Period #	A28JUL_1	A28JUL_2	A31JUL_1	A31JUL_2	Standard or Guideline	(**)
	Monitoring period	1228-1258	1353-1423	1110-1140	1330-1400		
	Date	JUL 28	JUL 28	JUL 31	JUL 31		
	Downwind / Upwind	DOWNWIND	DOWNWIND	DOWNWIND	UPWIND		
1	PROPANE	6	8	13	26		
2	CHLOROETHENE					3	IS
3	BUTANE	42	105	166	512		
4	PENTANE	27	32	72	148		
5	DICHLOROMETHANE		i			5300	TS
6	HEXANE	10	9	25	33	35000	G
7	TRICHLOROMETHANE					1500	G
8	1,2-DICHLOROETHANE						
9	1,1,1-TRICHLOROETHANE		T	T		350000	S
10	BENZENE	14	15	30	28	under review	
11	TETRACHLOROMETHANE		i			1800	G
12	TRICHLOROETHENE					85000	S
13	HEPTANE	T	T	T	T		
14	TOLUENE	33	31	55	35	2000	S
15	TETRACHLOROETHENE					10000	G
16	OCTANE	T	T	T	T	45400	PG
17	CHLOROBENZENE					4200	TS
18	ETHYLBENZENE	T	T	T	T	4000	S
19	M,P-XYLENE	T	T	30	T	2300	S
20	STYRENE	T				400	S
21	o-XYLENE	T	T	10	T	2300	S
22	1,1,2,2-TETRACHLOROETHANE						
23	NONANE						
24	1,2,4-TRIMETHYLBENZENE	i	i	i	i	500	G
25	1,3-DICHLOROBENZENE						
26	DECANE			T			
27	1,2-DICHLOROBENZENE					37000	TS
28	1,2-DIETHYLBENZENE						
29	UNDECANE						
30	1,2,4-TRICHLOROBENZENE					100	G
31	NAPHTHALENE					36	PG
32	DODECANE						
33	TRIDECANE						
	Total Organics (ug/m3)	183	278	455	832		

T - result between MDL and MQL
i - interference present, compound may or may not be present - so exact result is not quoted
** S - standard
TS - tentative design standard
IS - interim standard
G - guideline
PG - provisional guideline

Table 2 Canadian Gypsum Company (1989)
(ug/m^3)

	Period #	A3AUG_1	A3AUG_2	A3AUG_3	A4AUG_1	A4AUG_2
	Monitoring period	1052-1122	1210-1240	1417-1447	0937-1007	1056-1126
	Date	AUG 3	AUG 3	AUG 3	AUG 4	AUG 4
	Downwind / Upwind	DOWNWIND	DOWNWIND	DOWNWIND	DOWNWIND	UPWIND
1	PROPANE	12	10	6	14	15
2	CHLOROETHENE					
3	BUTANE	185	291	68	226	356
4	PENTANE	64	101	23	90	160
5	DICHLOROMETHANE					
6	HEXANE	17	23	T	25	45
7	TRICHLOROMETHANE					
8	1,2-DICHLOROETHANE					
9	1,1,1-TRICHLOROETHANE	T	T	T	T	T
10	BENZENE	19	i	T	26	35
11	TETRACHLOROMETHANE		i			
12	TRICHLOROETHENE					
13	HEPTANE	T	T			T
14	TOLUENE	36	25	T	51	61
15	TETRACHLOROETHENE					
16	OCTANE	T				T
17	CHLOROBENZENE					
18	ETHYLBENZENE	T	T		T	T
19	M,P-XYLENE	21	T	T	30	24
20	STYRENE				T	
21	o-XYLENE	T	T	T	9	T
22	1,1,2,2-TETRACHLOROETHANE					
23	NONANE					
24	1,2,4-TRIMETHYLBENZENE	i	i		i	i
25	1,3-DICHLOROBENZENE					
26	DECANE				T	T
27	1,2-DICHLOROBENZENE					
28	1,2-DIETHYLBENZENE					
29	UNDECANE					
30	1,2,4-TRICHLOROBENZENE					
31	NAPHTHALENE					
32	DODECANE	T				
33	TRIDECANE	T				
	Total Organics (ug/m3)	411	526	140	522	742

MDL - minimum detectable level, as determined from seven replicate injections
MQL - minimum quantifiable level (5 x MDL), below which exact numbers are not quoted
T - result between MDL and MQL
i - interference present, compound may or may not be present - so exact result is not quoted

Table 3 Canadian Gypsum Company (1989)

(all cartridges in this table were analyzed at ARB)

	Location:	Blank	Oak St.	Yelland/Queenslea	Yelland/Queenslea
	Date sampled:		07/27/89	08/02/89	08/03/89
	Time sampled:		1150-1220	0950-1020	1210-1240
	comments (if any)		some odor		
			dw	dw	dw
1	PROPANE		T	18	T
2	CHLOROETHENE				
3	BUTANE		32	45	117
4	PENTANE		21	36	45
5	DICHLOROMETHANE			T	
6	HEXANE		T	22	T
7	TRICHLOROMETHANE			37	
8	1,2-DICHLOROETHANE				
9	1,1,1-TRICHLOROETHANE		15	19	
10	BENZENE	2	18	i	8
11	TETRACHLOROMETHANE			i	
12	TRICHLOROETHENE				
13	HEPTANE			T	
14	TOLUENE		133	82	12
15	OCTANE			T	
16	TETRACHLOROETHENE			17	
17	CHLOROBENZENE	1	T	T	
18	ETHYLBENZENE		T	14	T
19	m,p-XYLENE		T	50	T
20	STYRENE			T	
21	1,1,2,2-TETRACHLOROETHANE				
22	o-XYLENE		T	16	T
23	NONANE			T	
24	1,2,4-TRIMETHYLBENZENE			20	
25	1,3-DICHLOROBENZENE				
26	DECANE			T	
27	1,2-DICHLOROBENZENE				
28	1,2-DIETHYLBENZENE				
29	UNDECANE			T	
30	1,2,4-TRICHLOROBENZENE				
31	NAPHTHALENE				
32	DODECANE			T	
33	TRIDECANE			23	
	Total Organics (ug/m3)	3	220	356	182